Neponset River Dredge Spoils Assessment Boston and Milton

Executive Office of Energy and Environmental Affairs (EOEEA)
Department of Environmental Protection (MassDEP)
Department of Conservation and Recreation (DCR)

Prepared by MassDEP, DCR & MACTEC Engineering & Consulting, Inc.
Contractor to MassDEP

MACTEC

Overview of Presentation

- Neponset River History
- Previous Studies
- Objectives of Sampling
- Data Evaluation
- Path Forward

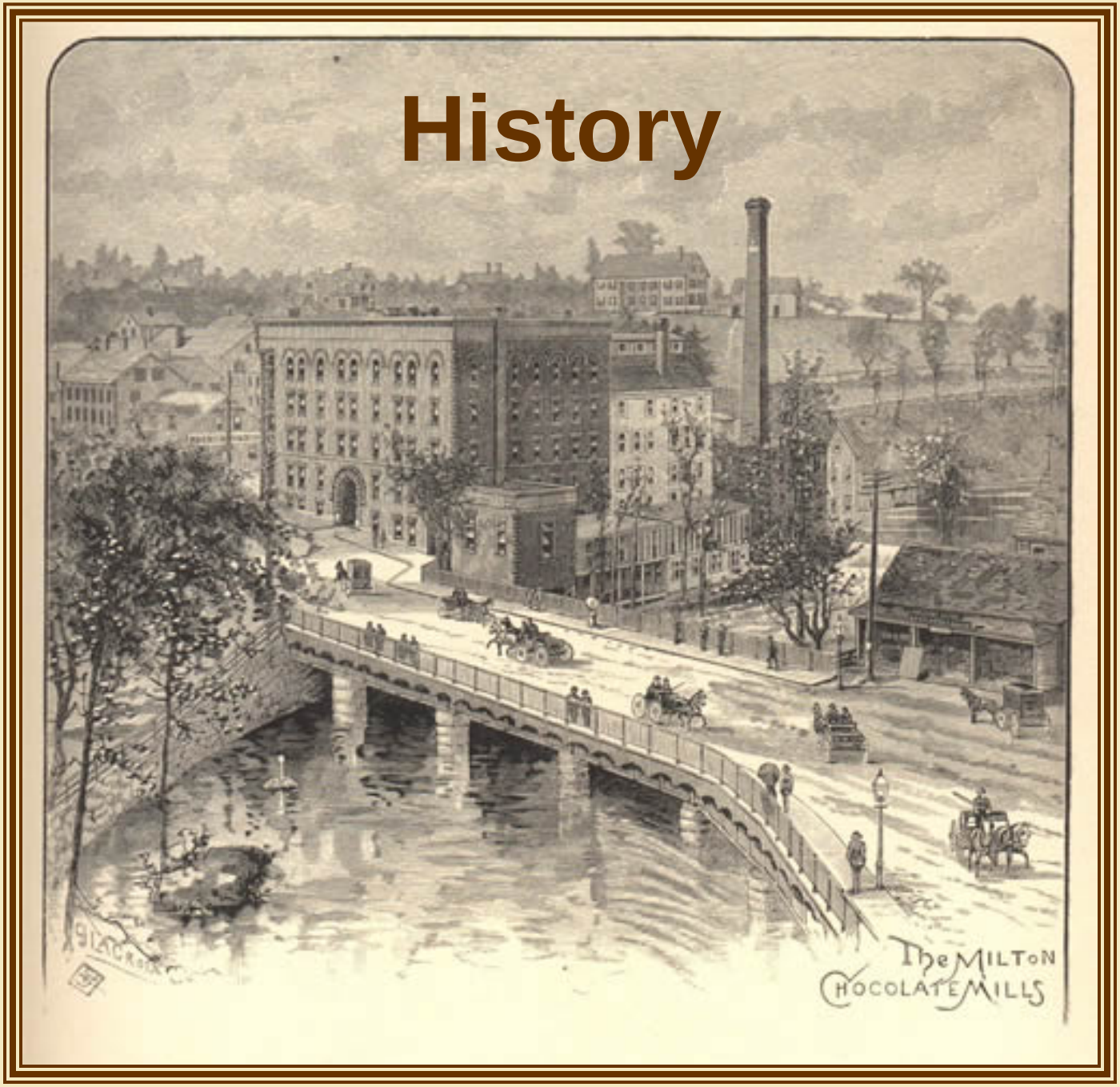
What are Polychlorinated Biphenyls (PCBs)?

- Chemicals used widely as cooling, insulating and di-electric fluids, especially in transformers.
- Manufactured by Monsanto from 1930s to 1970s.
- Persistent in nature and not very soluble in water.
- Accumulate in sediments and can accumulate in animal and plant life.
- PCBs are found widely in sediments.
- They are associated with cancer and non-cancer health effects in animals and people.

ATSDR fact sheet

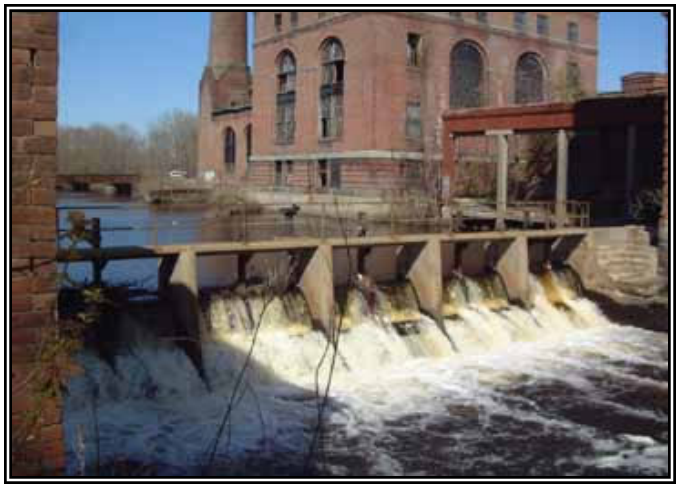

Neponset River Basin
Public Water Supply Sources
Community Groundwater Well
Surface Water Intake
Emergency Surface Water Intake
Non-Community Groundwater Well
Proposed Well
MA Town Boundaries
DEP Discharge to Groundwater Permit
NPDES Site
BWSC Site
TIER1A
TIER1B
TIER1C
TIER1D
TIERII
AUL Or Brownfield Site
River or Stream
Pond, Lake, Ocean
Reservoir
Neponset Watershed
Major Basins
0 1 2 4 Miles
BROOKLINE
BOSTON
NEEDHAM
LOWER NEPONSET
NEPONSET ESTUARY
MOTHER BROOK
DEDHAM
QUINC
MILTON
DOVER
PINE TREE BROOK
WESTWOOD
PURGATORY BROOK
BRAIN
FIELD
HAWES BROOK
FRANKAPOG BROOK
NORWOOD
RANDOLPH
MILL/MINE BROOK
MIDDLE NEPONSET
CANTON
EAST BRANCH NEPONSET
TRAPHOLE BROOK
HOLBR
WALPOLE
STEEP HILL BROOK
AVON
UPPER NEPONSET
STOUGHTON
MASSAPOAG BROOK
SHARON
N
Map Extent
FOXBOROUGH
Rhode Island

History



Neponset River History

- Dammed for hydropower since 1634.
- One of largest industrialized basins in mid-1700s.
- Several PCB using industries in basin from 1930's – 1970's.
- Flood control measures in early 1960s.
- Restoration Efforts:
  - Open Access for fisheries,
  - Increased recreational use.



LE Masin
98 Business Street
Boston, MA

N

0

BWSC Site

TIER1B

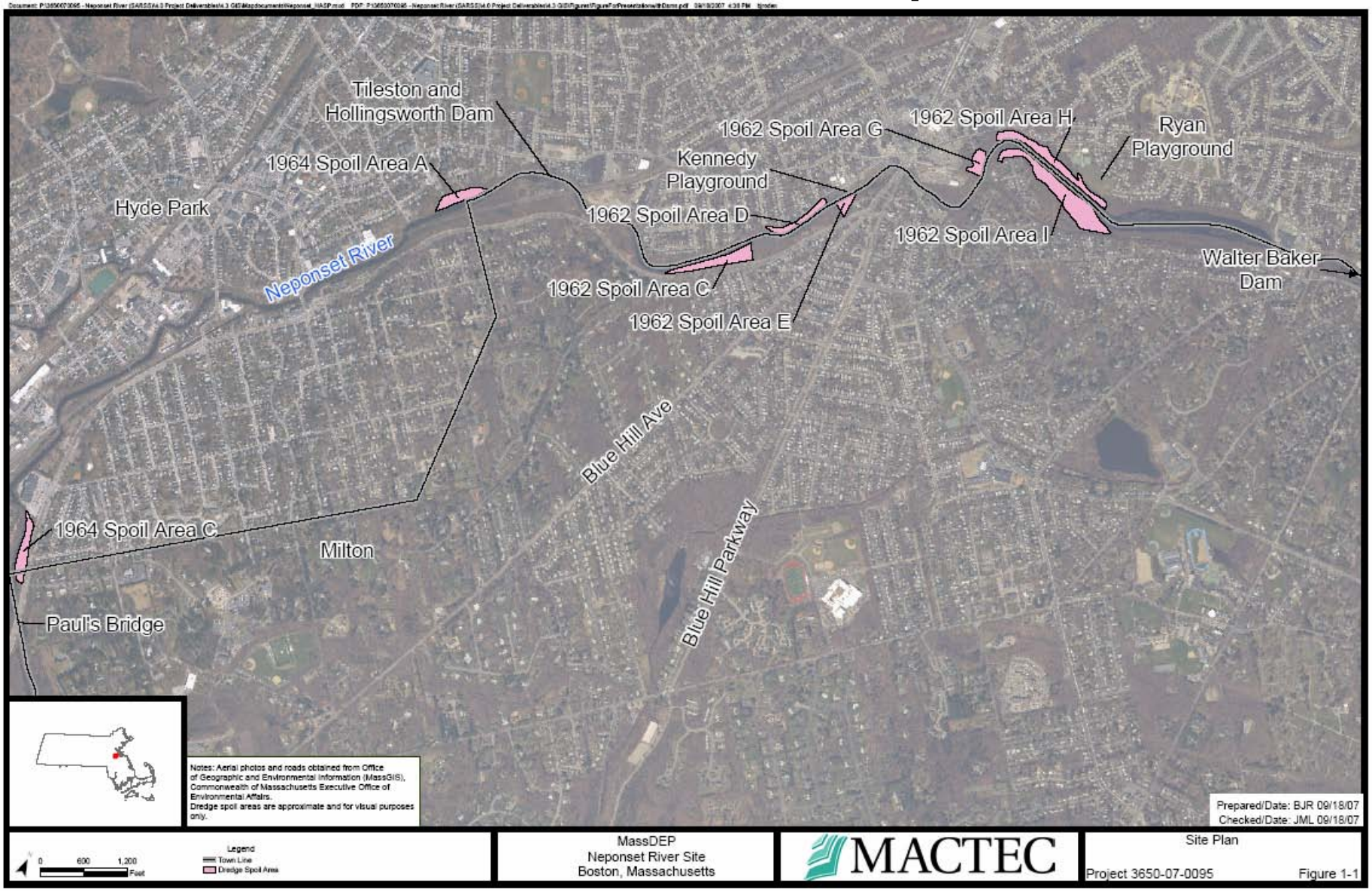
Map Extent

0 4.5 9 18
Miles

Dredge History Review

- 1955 flooding of Neponset River and across southern New England.
- Metropolitan District Commission (MDC, now combined with DEM as DCR) took ownership of dams on Neponset River.
- In 1962 and 1964, MDC performed repair work and flood control, including dredging:
  - 1962: Walter Baker Dam to Tileston-Hollingsworth Dam
  - 1964: Tileston Hollingsworth Dam to Paul's Bridge

Overview Map

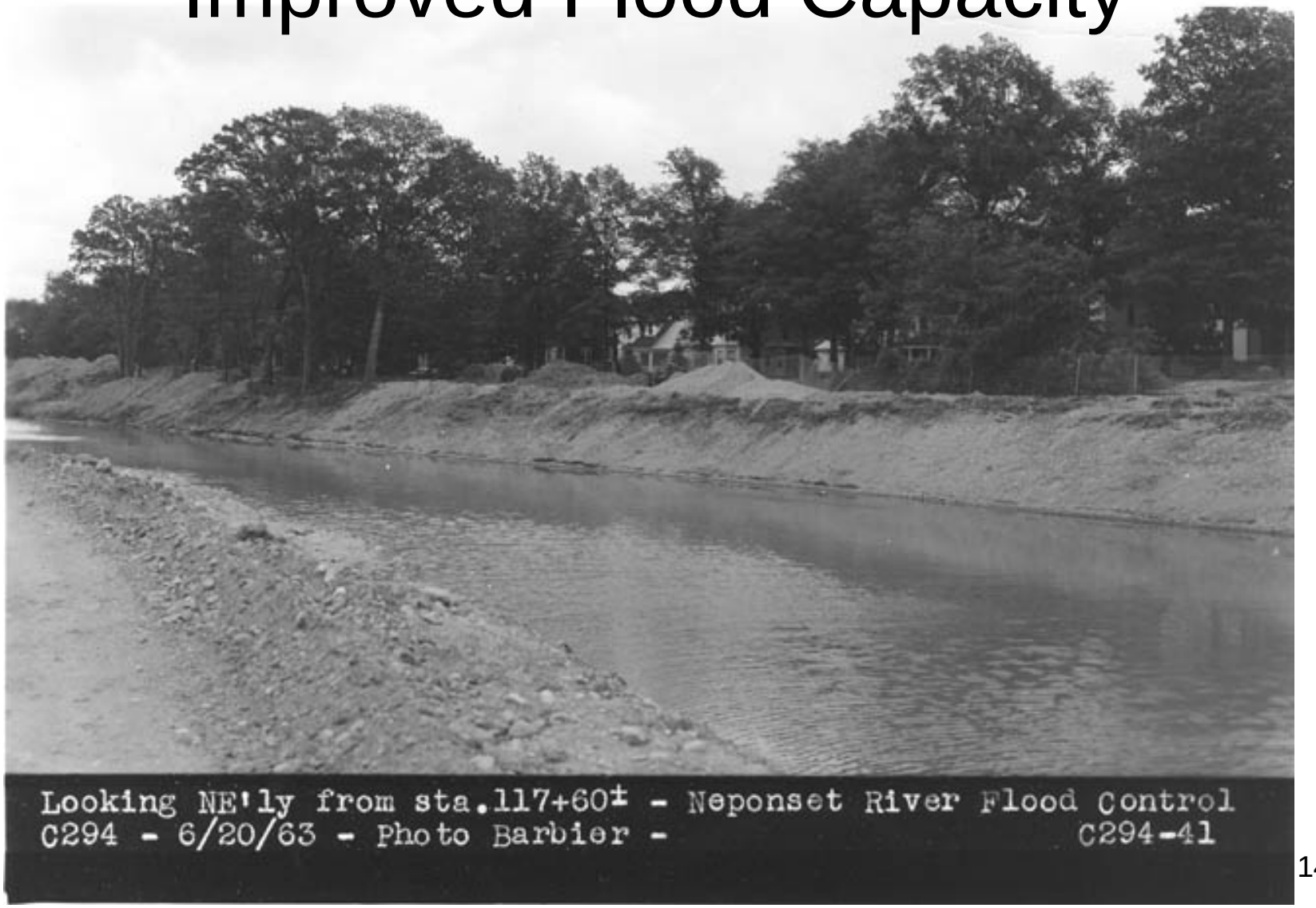


Dredging Barge

DIXIE" portable dredge - Looking N'ly from sta. 39+00 left -
Neponset River Flood Control - -C294 - 5/7/64 - Photo Barbier -
C294-89

Dredge Spoils Placed Adjacent to the River

Deepened River Channel for Improved Flood Capacity



Reinforced River Banks

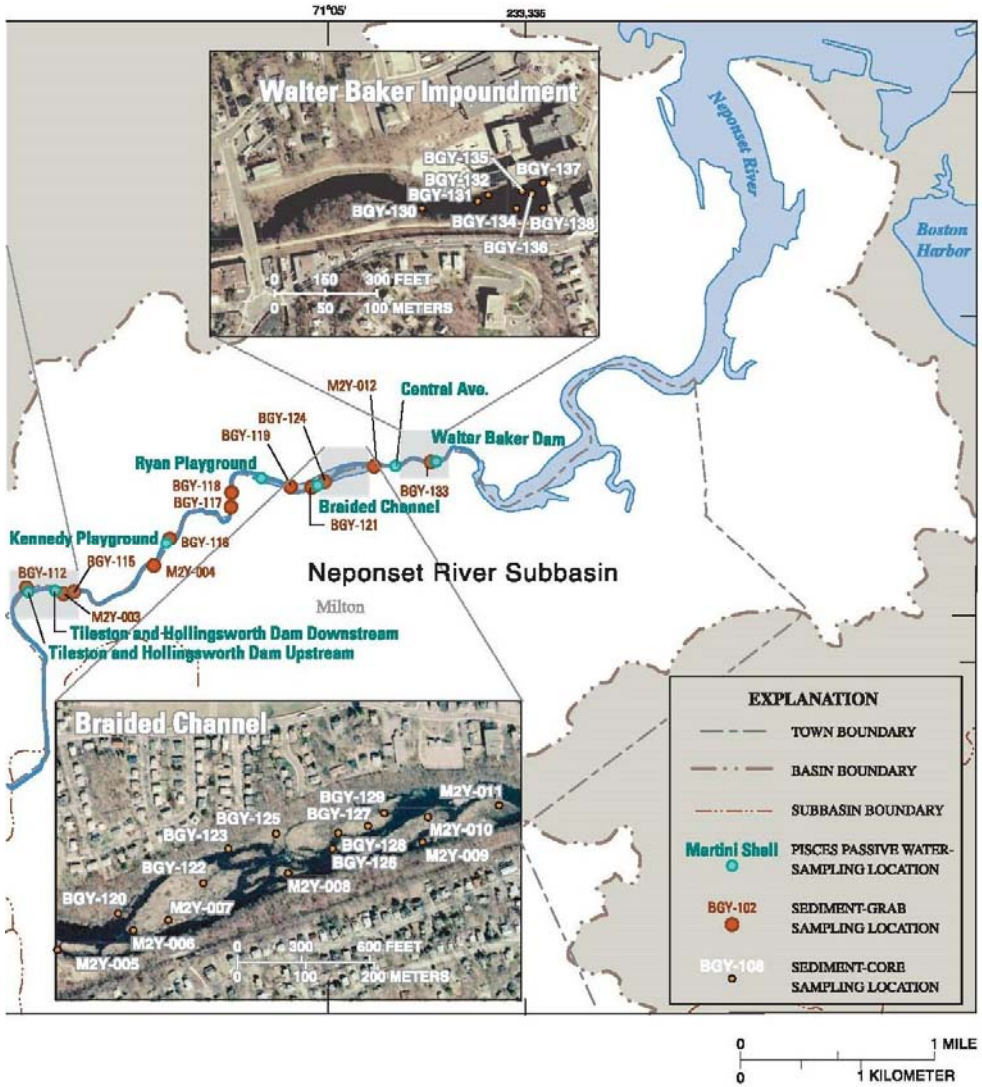
S'W'ly, near sta 156+00--Neponset River F.C.--C296--9/28/67
Photo Maley C296--145

US Army Corps Study (2002)

- Prompted by efforts to restore fish passage, habitat, and recreational use of Neponset River.
- Dam Removal Evaluation.
- Collected two sediment cores for analysis.
- “Bottom sediments enriched ... PCBs”.

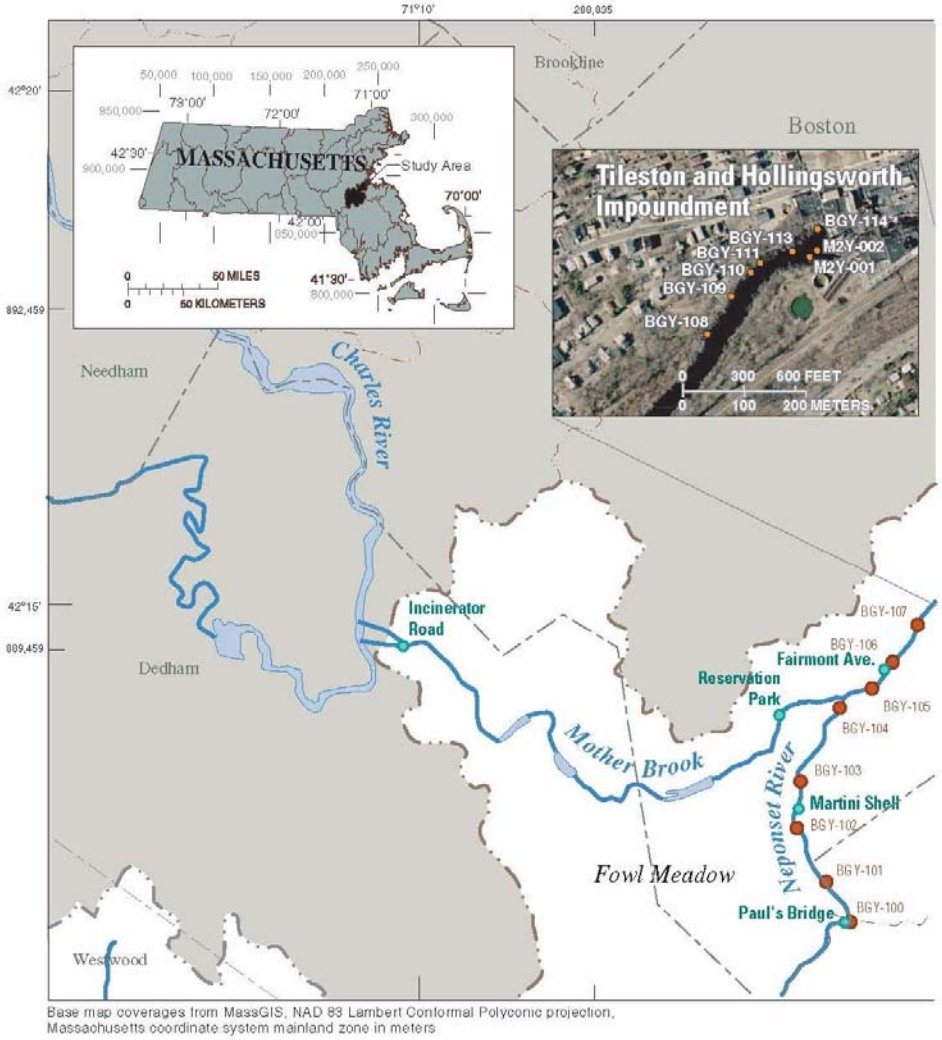
USGS & Massachusetts Department of Fish and Game Riverways Program

USGS Report,
"*Sediment Quality and Polychlorinated Biphenyls in the Lower Neponset River, Massachusetts, and Implications for Urban River Restoration*" in 2004



USGS Study

- In 2002 and 2003 USGS collected samples from the Neponset River:
  - 20 grab sediment (top 4”)
  - 31 sediment core (5”-50”)
  - 12 surface water
- Samples were analyzed for metals, pesticides, petroleum, and PCBs



USGS Conclusions

- “Although enriched relative to background, most constituent concentrations were equal to or less than those found in other urban rivers, with the notable exception of PCBs.”
- Range of Neponset PCB concentrations:
  - In grab sediment samples: <1.4 – 11 ppm
  - In sediment core samples: <1 – ~225 ppm
  - Typical urban sediments: <1 ppm

Source, *Estabrook Impoundment Sediment Remediation Pre-Design Study, Project Completion Report to USEPA,* Wisconsin Department of Natural Resources, August 2005.

Connections and Concerns over Possible Impacts

1. Sediments dredged and placed on river banks.
2. USGS findings suggest that some dredged materials placed on land may contain PCBs.
3. Some of the dredge fill areas are now actively used for recreation.
4. People may come in contact with exposed dredge fill that has PCBs above levels of concern.
5. MassDEP will sample dredge fill areas.

Assessment Focus

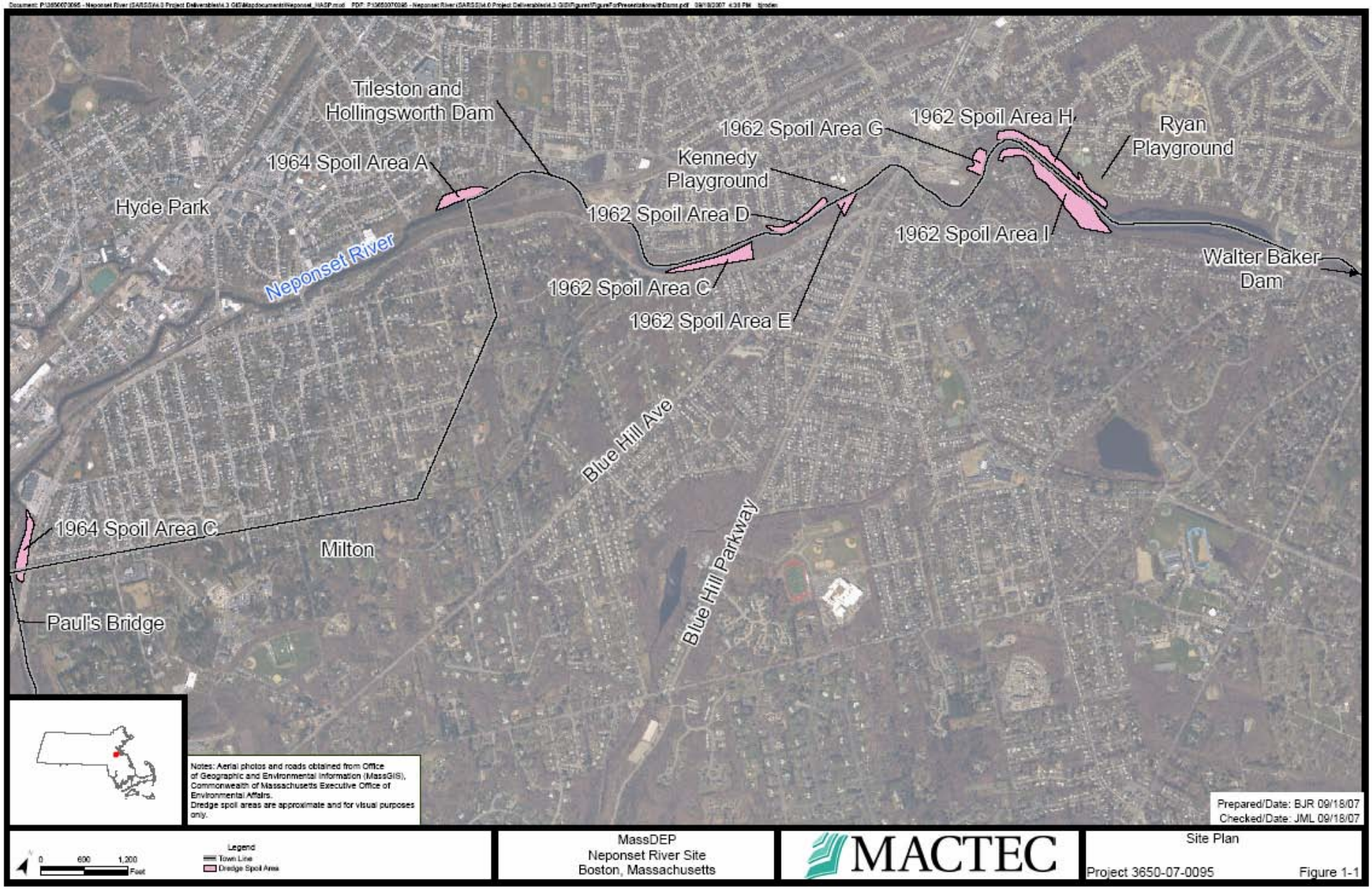
- DCR and MassDEP officials reviewed the 1962 and 1964 dredging historic plans.
- Plans noted 14 proposed areas to place dredge spoils.
- MassDEP and DCR officials walked these areas to see which areas are actively used and where people could possibly come in contact with the dredge spoils.
- Examples of active use:
  - Walking trails
  - Canoe launches
  - Fishing spots
  - Playgrounds

- Several dredge spoil areas are overgrown and not used by the public.
- Focus of this investigation is on eight actively used areas.

Actively Used Areas

Year	*Dredge Spoil Area*	*Approximate Volume in cubic yards*	*Location Description*
1962	C-294 Spoil Area “C”	37,000	Residential Area near Truman Highway, Milton
	C-294 Spoil Area “D”	10,000	Residential Area near Edgewater Drive, Boston
	C-294 Spoil Area “E”	4,500	DCR building on Truman Highway, Milton
	C-294 Spoil Area “G”	225	Public access/path near Riverside Place, Boston
	C-294 Spoil Area “H”	13,300	Ryan Playground (DCR) near River Street, Boston
	C-294 Spoil Area “I”	27,750	Residential Area near Eliot Street, Boston
1964	C-296 Spoil Area “A”	17,800	Business/Residential Area near Railroad Ave./Riverside Sq., Boston
	C-296 Spoil Area “C”	27,800	Business area (Stop & Shop) near Truman Highway, Milton

Assessment Areas



Exposure and Risk Discussion

- Contact with soil or sediment containing PCBs at elevated levels is required to put one at risk.
- Generally the top foot of soils or sediment is thought to be “readily accessible”.
- Potential Exposure Pathways:
  - Skin contact with soil and absorption through skin,
  - Incidental ingestion of soil (hand-to-mouth activity),
  - Inhalation of dust (typically negligible unless soil is significantly disturbed).
- MassDEP has identified levels of concern for PCBs and metals in soil in the “Massachusetts Contingency Plan” (the MCP).
- Soil levels above MCP standards may pose a health risk.
- MCP looks at life time exposure and short term exposure.
- If there is a short term risk, access and exposure to soils should be prevented or eliminated.

Purpose of Sampling

- Sampling targets locations that are used frequently and have received dredge spoils.
- Sampling will show if PCBs and metals are present at levels of concern in soil that people could come in contact with.
- Soil sample data will show whether more sampling is needed to fully define an area of concern or whether there is no need for concern.
- If PCBs or metals are present which show a short term risk, MassDEP and DCR will take steps to eliminate access to and prevent direct contact with the soil.

MCP Soil Standards

Chemicals in soil at levels greater than or equal to the following could pose a potential health risk over a lifetime:

PCBs: 2 parts per million (ppm)

Total Arsenic: 20 ppm

Total Cadmium: 2 ppm

Total Chromium: 30 ppm

Total Mercury: 20 ppm

Prevent direct contact with chemicals in soil at levels greater than or equal to the following:

PCBs: 10 ppm

Total Arsenic: 40 ppm

Total Cadmium: 60 ppm

Total Chromium: 200 ppm

Total Mercury: 300 ppm

Additional Sampling Locations

- Soil samples will be collected from select sensitive areas (ball fields, playgrounds) outside of known dredge spoil areas.

Sampling Plan Overview

- Up to 200 surface soil samples from 100 locations, depth intervals of 0”-6” and 6”-12”.
- Samples from pathways and at canoe launches and other actively used areas.
- Samples will be tested for PCBs; 20% will also be tested for 13 metals.
- Five sediment samples at canoe launches at 0”-6” will be tested for PCBs and metals.

SAP

FIGS

DCR Testing – May 2007

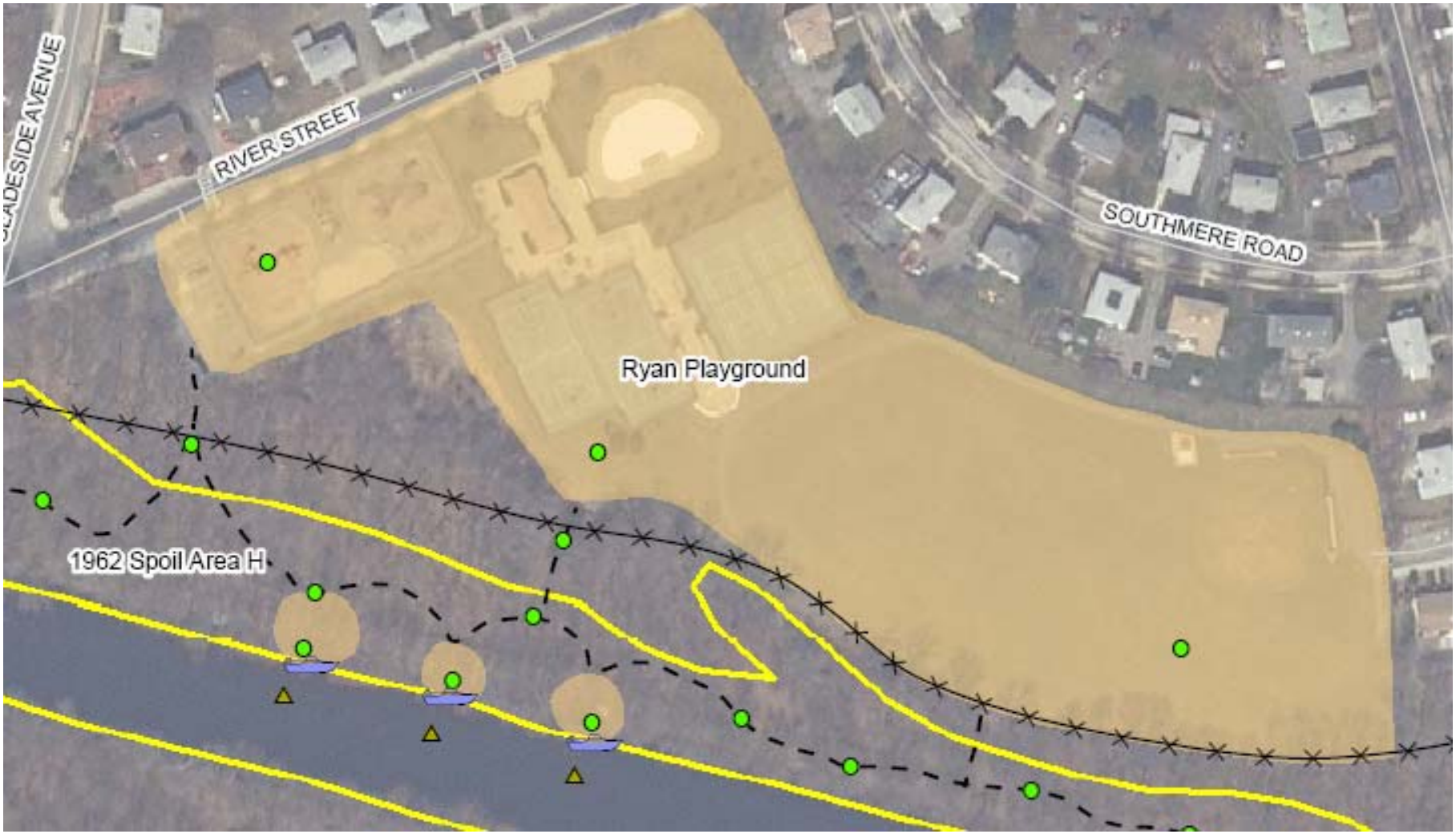
- Five samples were collected from surface soils adjacent to Ryan Playground and canoe launches
- The samples were analyzed for PCBs and Metals.
- Low concentrations of PCBs, trivalent chromium and lead were detected.
- All results are below MassDEP standards indicating no health concern.

FIGURE 1

Spoil Area H
Surface Soil Sampling Locations
310 River Street, Mattapan, MA
May 3, 2007

Note: Surface soil samples were collected between 0 and 12 inches.

Example of Sampling Locations



Sampling Procedures

- Sampling to be performed by hand with a soil auger and trowel.
- MassDEP or DCR representatives will be on-site to answer questions.
- Cones and caution tape will be used to isolate sampling locations.
- Excess soil will be returned to same sample location.
- GPS log of sample locations.
- Sample gear - Tyvek suits, gloves, hand auger, shovel, and trowel.

H&S

Cleaning Sampling Equipment

Proposed Schedule

- December – conduct sampling and submit samples for laboratory analysis.
- January – receive laboratory results and conduct data evaluation.
- February 2008 – briefing of public officials and the public concerning data evaluation results and proposed future actions.

Possible Outcomes

- Additional sampling to better define soil conditions.
- If soil levels show that immediate action is required to prevent or eliminate access to soil in an area:
  - Install fencing with warning signs
  - Remove contaminated soil
  - Cap contaminated soil
- If soil levels are elevated but immediate action is not required, work with DCR to arrange for the studies and actions needed to comply with the requirements of the “Massachusetts Contingency Plan”.

MassDEP Weblink and Future Actions

- A Mass DEP Weblink established for public access to the information about this investigation and its findings

www.mass.gov/dep/cleanup/sites/neponset.htm

- Hard copies of this soil sampling report will be made available to public officials.
- Copies will be placed in public repositories (Hyde Park Library and East Milton Library).
- Details of immediate actions to prevent direct contact, if needed and/or additional soil sampling to better define areas of concern will be provided thru public meetings and on the Weblink.
- Final project completion report will be provided in the same manner.

QUESTIONS & COMMENTS

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Wilmington, MA 01887
(978) 694-3353

Analytical Details

- PP-13 Metals (EPA 6010B (ICP), EPA 7470/7471, EPA 7000)

  - Beryllium
  - Cadmium
  - Chromium
  - Copper
  - Nickel
  - Silver
  - Zinc
  - Arsenic
  - Mercury
  - Antimony
  - Selenium
  - Lead
  - Thallium

- PCBs (EPA 8082 (GC))

  - Aroclor 1016
  - Aroclor 1221
  - Aroclor 1232
  - Aroclor 1242
  - Aroclor 1248
  - Aroclor 1254
  - Aroclor 1260
  - Aroclor 1262
  - Aroclor 1268

Nomen